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*Published to advance the Science of cold-blooded vertebrates*

## TRICHIURUS LEPTURUS LINN. FROM LONG ISLAND.

In searching through my records covering a period of twenty years I discovered two records of the cutlass-fish from Orient waters. The first individual, 17 inches in total length, was taken from Long Island Sound, July 16, 1902. The second was from Gardiner's Bay, in ten feet of water, on August 27, 1909. This specimen was 19 inches in total length. Its occurrence appears to be that of a very rare straggler.

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## ON THE GENERA *Orestias* and *Empetrichthys*.

The genus *Orestias*, consisting of a number of species, is as far as known, confined to lakes and the stagnant portions of the rivers of the uplands of Central Peru and North central Chile.<sup>1</sup> During the Irwin Expedition of Indiana University it was found as far north as Gollarisquisga. It was found to be abundant in some of the streams and lakes about Cerro de

<sup>1</sup>Prof. E. W. Berry expressed the opinion to the writer that the first uplift in the region of the Andes was eroded to mature topography. The present great height of the Andes is the result of a later uplift. The region about Junin and to a less extent about Lake Titicaca shows the ancient topography lifted to a height of 12,000 feet and more. Toward this highland, the streams from the east and west have cut deep gorges. Thus the Rimac flows in a narrow deep valley from Ticlio to Callao on the west and the Tarma river has cut a similar gash from above Tarma to La Merced on the east.

*Orestias* seems to be confined to the ancient highlands and the immediate slopes.

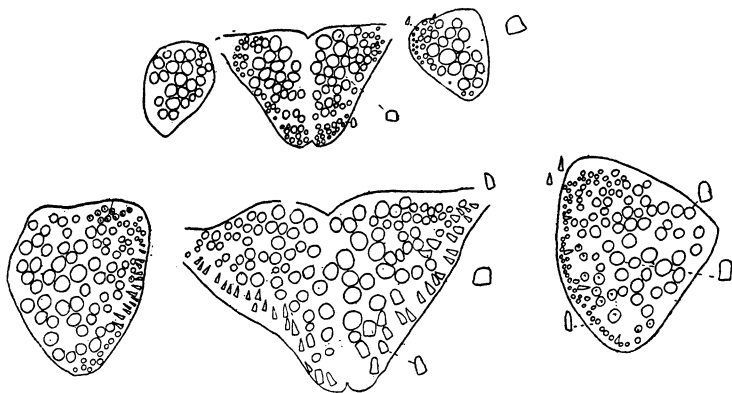
Pasco, Junin, Tielio, Oroya, Jauja and Huancayo. Near Casapalca it occurs in some of the lakes of the Rimac basin on the Atlantic slope. Garman has previously recorded it from some of the lakes of this basin.

In the Urubamba system one small species was found just below Ollantaytambo at about 7000 feet. Below this elevation it was not seen. Different species are found in the lakes near Cuzco, Chinchero, Urcos and Langilaio, all of the Urubamba basin. Its point of greatest abundance both in individuals and in species is Lake Titicaca. Some of the species here attain a length of about a foot. Some of the larger are served in the restaurants as Pejerrey and masses of some of the smaller species are sold in the markets dried together into cakes. It is found also in Lake Poopo into which Lake Titicaca drains and in the pools and creeks of the salinas south of Poopo along the railroad line inland from Antofagasta. I have an enormous number of specimens and hope sooner or later to determine the variation, modification with sex and age, etc., of the different species. Being found only in the highlands and reaching probably the highest altitude inhabited by fishes the question of the origin of this genus has always excited interest. *Orestias* is associated with various species of the genus *Pygidium*, in places with species of *Astroblepus*, even *Bryconamericus* and *Ancistrus*. All of these genera are mountain scalers, at home in the torrents from near sea-level to the heights. They may have worked their way up the present streams. Not so *Orestias*. It is not found in the torrential portions of the streams, but in backwater, lagoons, swamps, quiet places of the rivers and lakes, never, as far as known, below 7000 feet. It attains a height of about 16,000 feet and is at its best around 12,000 feet. No relatives are known to occur in the lowlands skirting its mountain homes. It is an ancient genus whose origin is bound up with the origin of the Andes. Its ancestors were pushed up by the rise of the Andes and

thus isolated from their relatives which are practically extinct in Peru.

Its distinguishing characters are the united lower pharyngeal bones and absence of ventral fins. The teeth on the pharyngeals differ from slender needles to rounded pavement. The shape of the pavement teeth is an adaptation to the nature of the food; only those species feeding on small mollusks have pavement teeth. The shape of the short blunt pavement teeth is not due to wear since relay teeth which have not pierced the gum have the same shape as those long in use. The teeth in the jaws are in single series, needle shaped or conic.

*Empetrichthys*, the genus most closely related to *Orestias*, consists of one species, *merriami*. It is found at Ashmeadows and Pahrump Valley, Nevada near the boundary between California and Nevada, at an elevation of about 3800 feet. (Ashmeadows). It also lacks ventrals and the lower pharyngeals are also united. The teeth of the jaws are in two series with a few teeth scattered between the series. They are triangular, compressed antero-posteriorly. The teeth on the pharyngeals are pavement teeth, very similar to those of the *jussei* group of the genus *Orestias*.



PHARYNGEAL TEETH OF *EMPETRICHTHYS* (above)  
and *ORESTIAS* (below)

Are *Empetrichthys* and *Orestias* so widely separated in space the remnants of a group of the Poeciliidae formerly generally distributed in the mountains between the United States and Chile or are they products of the Independent but parallel evolution of *Fundulus*? They are so similar that they might readily be considered as forming but one genus. The double series of teeth in the jaws and the terminal though oblique mouth and the slightly more posterior position of the dorsal are the only characters distinguishing *Empetrichthys* from all of the species of *Orestias*.

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*NOTES ON Lampropeltis elapsoides virginiana*  
BLANCHARD.

In Number 81 of Occasional Papers of the Museum of Zoology, University of Michigan, this form is described by Mr. Blanchard, the type and one other specimen being from Raleigh, N. C., and he remarks, "So few specimens of this form are known that no general description can be drawn up."

To aid in throwing more light on this and related forms, I give below my notes on a number of "red king snakes" taken in this locality, not guaranteeing that all or any belong to this particular subspecies. The numbers used in referring to these snakes are from a serial list in my possession, the gaps being occupied by specimens (from other states) not referred to in this paper.

All are from Raleigh, North Carolina, the type locality of *virginiana*, except No. 32 from Rutherfordton, N. C.

No. 7, April 26, 1901, loreals absent, first row of temporals 1-1, scale rows 19. In the other specimens the scale rows are 19, and the first row of temporals 1-1, unless otherwise stated.